

Precalculus Solving Trig. Equations Review

Find the exact value without using a calculator.

1. $\cos^{-1}\left(-\frac{1}{2}\right) = \frac{2\pi}{3}$

2. $\arctan(1) = \frac{\pi}{4}$

3. $\sec^{-1}\left(\frac{2\sqrt{3}}{3}\right) = \frac{\pi}{6}$

Find the exact value in degrees without using a calculator.

4. $\csc^{-1}(-\sqrt{2}) = -45^\circ$

5. $\arcsin\left(\frac{1}{2}\right) = 30^\circ$

6. $\cot^{-1}(-\sqrt{3}) = 150^\circ$

Find the approximate value using a calculator.

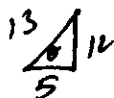
7. $\sec^{-1}(-1.5643) \approx 2.26$

Find all values for x in the interval $[0, 2\pi]$ that satisfy the equation.

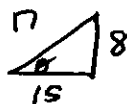
8. $\tan(x) = \sqrt{3} \quad x = \pi/3 + \frac{4\pi}{3}$

Find the exact value of the composition.

9. $\csc\left(\cos^{-1}\left(\frac{5}{13}\right)\right) = \frac{13}{12}$

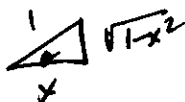


10. $\cos\left(\arctan\left(\frac{8}{15}\right)\right) = \frac{15}{17}$

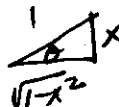


Find an equivalent algebraic expression for the composition.

11. $\tan(\arccos(x)) = \frac{\sqrt{1-x^2}}{x}$



12. $\sec(\arcsin(x)) = \frac{1}{\sqrt{1-x^2}}$



Find the acute angle θ , to the nearest hundredth of a degree for the given function value.

13. $\csc \theta = 6.354 \approx 9.05^\circ$

14. $\sec \theta = 4.321 \approx 76.62^\circ$

Find all real numbers that satisfy the equation.

15. $2\cos x + \sqrt{3} = 0$

$\cos x = -\frac{\sqrt{3}}{2} \quad x = \frac{5\pi}{6} + 2\pi k$

$x = \frac{7\pi}{6} + 2\pi k$

Find all real numbers in the interval $[0, 2\pi)$ that satisfy the equation.

16. $\sqrt{2} \sin(3x) = 1$

$$\sin 3x = \frac{1}{\sqrt{2}}$$

$$3x = \frac{\pi}{4} + 2\pi k$$

$$x = \frac{\pi}{12} + \frac{2\pi}{3} k$$

or $3x = \frac{3\pi}{4} + 2\pi k$

$$x = \frac{\pi}{4} + \frac{2\pi}{3} k$$

$$\left\{ \frac{\pi}{12}, \frac{3\pi}{4}, \frac{\pi}{4}, \frac{11\pi}{12} \right\}$$

Find all real numbers that satisfy the equation.

17. $2\cos^2 x = \cos x$

$$2\cos^2 x - \cos x = 0$$

$$\cos x (2\cos x - 1) = 0$$

$$\cos x = 0$$

$$2\cos x - 1 = 0$$

$$\cos x = \frac{1}{2}$$

$$x = \frac{\pi}{2} + \pi k$$

$$x = \frac{\pi}{3} + 2\pi k$$

$$x = \frac{5\pi}{3} + 2\pi k$$

Find all angles in the interval $[0^\circ, 360^\circ)$ that satisfy the equation.

18. $2\sin x \cos x = 1$

$$\sin 2x = 1$$

$$2x = 90^\circ + 360^\circ k$$

$$x = 45^\circ + 180^\circ k$$

$$(x = 45^\circ, x = 225^\circ)$$

19. $\frac{2\sin x}{\cos x} = \frac{\cos x}{\cos x}$

$$2 \tan x = 1$$

$$\tan x = \frac{1}{2}$$

$$x = \tan^{-1}\left(\frac{1}{2}\right) = 26.6^\circ$$

$$(x = 26.6^\circ, 206.6^\circ)$$

20. $\sin^2 x + 9 = 6\sin x$

$$\sin^2 x - 6\sin x + 9 = 0$$

$$(\sin x - 3)^2 = 0$$

$$\sin x = 3$$

$$x = \sin^{-1}(3)$$

(no solution!)